

Vocational training and European standardisation of qualifications: the case of aircraft maintenance

Dr. Joachim Haas

Researcher, CEREQ (Centre for Qualifications Research) / LIRHE (Inter-disciplinary Research Laboratory into Human Resources and Employment)
Social Sciences Department, Toulouse I University

Maurice Ourtau

Research engineer, CNRS (National Centre for Scientific Research) / LIRHE,
Social Sciences Department, Toulouse I University

Keywords

Training standard,
accreditation of
training, equivalence
of certificates, highly
skilled worker,
Community regulation,
EC internal market

SUMMARY

Initiatives to standardise the conditions for practising certain regulated activities are being taken at European level, particularly in light of the free movement of people and the recognition of qualifications in Member States. This paper looks at the introduction of European licences for aircraft maintenance engineers. It follows an in-depth analysis of the process for the construction and application of these standards, and is an attempt to define the real motivation behind these special initiatives. It reports on how Community provisions which, in many respects, conflict with national structural characteristics in the area of qualification construction and management, are being transposed.

Introduction

An increasing number of initiatives have been introduced in the area of educational cooperation in Europe since the end of the 1990s. In the case of higher education, one of the things the Bologna process aims to achieve is a common three-cycle structure (Bachelor, Master, Doctorate) for curricula and the consolidation of a credit transfer system. Measures have been taken in the area of vocational training aimed at obtaining transparency between qualification levels (the EQF project ⁽¹⁾) and the mutual recognition of vocational training units (the ECVET project ⁽²⁾).

These measures are basically attempting to create a European area of cross-border recognition of qualifications but without having to harmonise the qualification systems. In fact, the 1992 European Treaty expressly prohibited any EU policy aimed at educational standardisation.

At the same time, we are seeing two types of initiative in Europe aimed at just this harmonisation, and in particular the standardisation of training content. One of the initiatives introduced by France during its Presidency of the European Union (in 2000) is a pilot project to create two European professional qualifications in the automotive and hotel industries. These new qualifications are characterised by common core training content (Asseraf, 2004). The diplomas, validated by each country participating in the project, will continue to be national diplomas, although their creators remain optimistic that they will be recognised on the labour markets in the various European countries. Included in the European Leonardo programme under the title 'Sustainable professionalisation', this approach has been extended to other business sectors.

A second move towards the European standardisation of qualifications involves 'vocational qualifications' which will from now on be required in order to practise certain regulated trades. At the moment these basically involve qualifications in the transport sector: seafarers, the Community railway network and civil aviation ⁽³⁾.

(1) European Qualifications Framework: Cf. Working document of the European Commission *Towards a European qualifications framework for lifelong learning*, Brussels, 8/7/2005, SEC(2005) 957.

(2) European Credits for Vocational Education and Training

(3) Directive 2001/25/EC concerning 'seafarers.' Directive 91/440/EEC concerning the 'certification' of train drivers operating locomotives. Regulation No 2042/2003/EC relating to aeronautical maintenance, one of the activities regulated in the field of civil aviation.

This paper examines the latter initiative, and focuses on describing the particular case of the European standardisation of vocational qualifications for aircraft maintenance personnel. This was the subject of an in-depth analysis (Haas et al., 2006) during research conducted on behalf of the French Ministry of Education, which was concerned about the impact of this initiative on its national training and qualification system. The aim of our paper is to present selected observations from this case study, relating to European cooperation in the area of vocational training. These observations cover the reasons for European cooperation, the implementation of a training approval system and the mutual perception of national training-qualification systems.

The issues examined in this research, which includes a comparison between three countries (Germany, France and the United Kingdom) in the area of the relationship between training and employment, are drawn from work on the societal effect (Maurice et al., 1982), and the work of Soskice and Hanke (1997) on the existence of national 'regimes' peculiar to individual countries. For these authors, the existence of a particular national structural cohesion between the vocational, organisational and educational spheres means that each country has its own approach when making adjustments.

The methodology used in our research is based on an exploratory, comparative, qualitative and historical approach (see the box entitled 'The methodology used').

Following a brief overview of the system studied and its characteristics in relation to other European initiatives in the qualifications field, the paper analyses the reasoning behind the European standardisation of qualifications for aircraft engineers. The third section examines how the new European regulations are being implemented in each of the three countries selected, the problems associated with their individual national characteristics and the key role played by confidence in the international recognition of qualifications.

The methodology used

The research revealed the lack, at least in the case of France and Germany, of public debate and comments on the European construction of aircraft maintenance qualifications (the *Parts* system, see below). The paucity of directly usable information available in this particular instance first meant that a database drawn from documentary research needed to be set up first. This research very largely involved mainly English-language literature: circulars and background documentation for standards, various reports issued by aircraft surveillance agencies (the National Civil Aviation Authority in the United Kingdom and the Joint Aviation Authorities) comments in the specialist press, parliamentary debates in the United Kingdom, etc. Initial processing of the data enabled us to identify the main issues for analysis, to prepare for the field investigations and to produce questionnaires.

Twenty semi-directive interviews were subsequently conducted over the course of 2005 and 2006 with experts representing the organisations affected by the implementation of the new European regulations in each of the three countries. The interviews were conducted using questionnaires sent to the interviewees in advance, which comprised two large sets of questions concerning the major debate that informed the negotiations about the development of the regulation and the role played by stakeholders, and the solutions expected to be adopted for its national implementation and associated problems. Many of the experts questioned were retired 'veterans' (the negotiations on the qualifications concerned took place between 1989 and 1997).

In addition to these interviews, the authors regularly monitored and analysed exchanges on this subject in the specialist forums for aircraft engineers* who sometimes asked their own questions.

* <http://groups.google.com/group/fr.rec.aviation/> [04-04-2008]
<http://www.rcoco.com>
<http://www.pprune.org>
<http://www.airmech.co.uk>
<http://www.airliners.de>
<http://www.flugzeugforum.de>

The Part System: a set of European regulations for aircraft maintenance

The common system governing aircraft maintenance qualifications was developed by the JAA (Joint Aviation Authorities) in the 1990s. It was implemented by countries in the first decade of the 21st century, under the direction of the new European Aviation Safety Agency (EASA) ⁽⁴⁾.

The system comprises three regulations which set out the requirements relating to maintenance organisations ('Part-145'), training ('Part-66') and training organisations ('Part-147'). ⁽⁵⁾

- 'Part-145' sets out the methods for the organisation and operation of maintenance organisations. In particular, it ensures that the infrastructure allows suitable vocational experience to be gained. 'Part-145' came into force in 1994.
- 'Part-66' defines the requirements for the awarding of qualifications to engineers responsible for issuing Release to Service certificates (CRS) for aircraft and aircraft components ⁽⁶⁾. It establishes a licence (in the sense of 'permit') system for this purpose which comprises a three-tier structure: licences A, B and C, corresponding to line maintenance mechanics, line maintenance technicians and base maintenance engineers. Each licence corresponds to specific training content, specialist subject areas and amounts of experience. The European regulation was adopted in June 1997 following negotiations that began in the late 1980s.

⁽⁴⁾ The EASA is a European Community agency tasked with assisting the Commission in the harmonisation of air safety regulations. The Agency organises theme-based working groups with representatives from the Member States (national, civil and military aviation authorities). Once provisions have been voted on and adopted, the resulting texts are submitted to the European Commission. Once established as European regulations, the provisions have to be transposed into national regulations. The EASA is charged with monitoring this transposition and ensuring compliance with the rules.

⁽⁵⁾ The three regulations form part of Commission Regulation (EC) No 2042/2003 of 20 November 2003 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks. The regulation was published in the Official Journal of the European Union No L 315 of 28/11/2003, p. 1-165.

⁽⁶⁾ This approval authorises the engineer to 'release' the aircraft or a component or appliance following maintenance, in other words, approve its being put back into service. The act of releasing consists of a signature confirming that maintenance operations have been correctly completed. This declaration forms part of the international requirements for the operation of aircraft.

Since the system was introduced (in October 2006) the holding of a suitable Part-66 licence has been compulsory for all European CRS personnel ⁽⁷⁾. This professional group now comprises approximately 100 000 individuals (EASA, 2007), i.e. 40 % of all maintenance staff. The remaining 60 % are mainly unqualified technical personnel who undertake maintenance operations under supervision.

- 'Part-147' sets out operating rules for the training organisations authorised to deliver training in compliance with Part-66 and award qualifications to candidates. This system also came into force in 2006.

Part-66 forms the focus of our paper, although the methods for its implementation overlap with the other two regulations, 145 and 147.

The Part-66 'European vocational certificate'

The core training content and basic examinations, as key elements of the licence set out by Part-66, are 100 % standardised. The European Agency (EASA) ensures that any national variations are eliminated. Candidates without equivalent experience must undergo 2 400 hours of training i.e. two years of full-time theory and practice to obtain a basic B licence (technician). This training must be supplemented by lengthy on-the-job experience in maintenance work (at least two years) followed by additional specialist training on the aircraft components assigned (type training).

The aircraft maintenance licence is the prototype of a European vocational qualification system currently used in regulated activities in the transport sector (train drivers, aircraft pilots, seafarers, etc.) This type of qualification differs in various ways from the European vocational diplomas referred to in the introduction to this article:

- educational system versus profession: whereas the approximation of diplomas at European level is being orchestrated by representatives from the educational authorities, the European harmonisation of qualifications such as in aircraft maintenance is based on negotiations with representatives from the profession (in this case the European aviation authorities assisted by national and European professional bodies);
- national control versus European control: European qualifications fall outside the framework of national sovereignty and its system

(7) Although a licence is now required for assignment to 'CRS' jobs, the employer is still responsible for selecting such staff from amongst eligible candidates in its organisation.

of negotiated development. Major decisions are debated and taken by a European professional organisation (for example, the EASA), while the national authorities are responsible for the introduction, monitoring and day-to-day management of the system. They are audited regularly by the European Agency;

- amalgamation versus new model: unlike the development of European diplomas, the core content in European certificates is not the sum of national individual requirements, but an original combination of a selection of elements derived from industry practices and practices in countries with a certification tradition, but also elements derived from new ideas;
- subsidiarity versus single regulation: unlike European diplomas, the management of European qualifications is not based on the principle of subsidiarity. Apart from national differences in the minimum educational and professional experience necessary to apply for the qualification tests, the system is organised in a highly standardised manner: the core content and the qualification methods (compulsory multiple-choice questions), the qualifications obtained and the experience needed for the required authorisations can be awarded are all standardised;
- voluntary versus compulsory recognition: the European qualification will now be a requirement when applying for jobs in the area of activity concerned (a CRS job in the case of aircraft maintenance). National professional supervisory firms and bodies must therefore automatically recognise the qualifications concerned irrespective of the country where they have been obtained. This obligation does not apply in the case of European professional diplomas.

The organisations surveyed

Germany

BIBB (Bundesinstitut für Berufsbildung), the Federal Institute for Vocational Education.

LBA (Luftfahrtbundesamt), German Civil Aviation Authority.

BPvL (Bundesverband der Prüfer von Luftfahrtgerät), Association of Aircraft Equipment Testers.

VL (Vereinigung Luftfahrt), employee association in the air transport sector.

A training officer from a 'Part-145' certified aircraft maintenance organisation.

France

DGAC (Direction générale de l'aviation civile), French Civil Aviation Authority.

GSAC (Groupement pour la sécurité de l'aviation civile), Civil Aviation Safety and Inspection Agency.

Ministry of National Education:

- DGESCO (Direction générale de l'enseignement scolaire), heads of the aviation professional advisory sub-committee;
- a 'Part-147' training organisation preparing for Part-66 certification.

AFI (Air France Industrie), a company that has 'Part-145' maintenance organisations and a 'Part-147' school.

FNAM (Fédération nationale de l'aviation marchande), National Commercial Air Transportation Federation (employers' association).

SNMSAC (Syndicat national des mécaniciens au sol de l'aviation civile) National Trade Union of Civil Aviation Ground Mechanics.

CGT (Confédération générale du travail, section Transports aérien), General Confederation of Labour, Air Transport Section(trade union).

United Kingdom

CAA (Civil Aviation Authority).

QCA (Qualifications and curriculum authority), responsible for the recognition of training delivered in England.

ALAE (Association of Licensed Aircraft Engineers).

SEMTA (Sector Skills Council: Science, Engineering and Manufacturing Technologies Alliance).

Europe

EASA (European Aviation Safety Agency).

Global

AEI (Aircraft engineers international), international federation of associations and trade unions for aircraft engineers.

Why have European standardisation of qualifications?

Research conducted on the negotiation of the Parts and the implementation of the regulations in the three countries selected produces a number of sometimes unexpected findings. We will focus here, first, on the awarding of qualifications to individuals as a key element in the existence of an extended maintenance market, and, second, on the severe restrictions that are placed on the principle of subsidiarity in the area of training in order to guarantee the quality of the services provided in a sector where issues of safety are crucial.

Obstacles associated with European heterogeneity in certification methods

During the post-war period, Europe saw the ‘balkanisation’ of the qualifications required to become an engineer entitled to issue release to service certificates. Although the technical requirements of maintenance jobs were identical in every country, the requirements in terms of qualifications varied greatly. Concerning methods of certification, for example, the regulations in some countries such as Germany and the United Kingdom required firms to appoint to release to service engineer posts only candidates with a national licence specific to the jobs in question. Other countries such as France did not have individual qualification, relying instead on qualifying training and work experience gained within a company audited by the National Civil Aviation Authority, which was authorised to accredit companies (Haas, 2006). A lot of companies used a hybrid system; exemption from the national air code as regards the licence requirement for release to service posts had to be negotiated by companies with the National Authority. Considerable differences were also evident in the professional background of the pool of candidates. In some countries, such as France and Germany, the candidate pool basically comprised young people with vocational training qualifications (in aircraft maintenance or associated specialisations). In several other countries, such as the United Kingdom, maintenance engineers were usually former military personnel who had undergone re-training. Further differences related to the specialisations required, the minimum age, required experience, examination methods and knowledge of English.

Contrary to the reasons frequently put forward to justify the standardisation of individual qualifications at EU level, (ensuring freedom of establishment and facilitating the movement of labour), the key aim in the case of aircraft maintenance was, according to our analysis, to facilitate the commercialisation of services in which safety is of critical importance. Numerous air transport companies started to show a great deal of interest in sub-contracting their maintenance work, particularly the demanding technical inspections requiring considerable investment in infrastructure. C-Check work, which must be carried out approximately every 18 months, takes between one and two weeks. D-Checks involve fully dismantling and reassembling the aircraft, which requires one to two months' work and is carried out every five to eight years. Other companies wanted to take advantage of this move towards outsourcing to change their maintenance operations from cost centres into profit centres.

The cost savings expected from outsourcing or specialisation requires a broad European market, similar to the internal market in the USA, for example. Outsourcing is only beneficial if the maintenance service providers can make economies of scale by having a sufficient number of contracts. This means dealing with foreign clients. Conversely, the sub-contracting of maintenance is only cost-effective and time-saving if the company can assign this work to companies subject to the competition of an extended, and therefore Europe-wide, market. According to the figures for 2006, Europe accounts for approximately a third of the world market in civil aircraft maintenance, calculated at USD 41 billion ⁽⁸⁾.

One major obstacle was getting in the way: the wide variation in the national regulations in force. Aircraft maintenance is deemed to be an activity in which safety is of critical importance (comparable to some areas of the chemical, nuclear, military and health industries) and which requires compliance with national regulations and supervision by national aviation authorities. In order for maintenance activities to be accredited, the authorities require work to be carried out in accordance with national standards: technical regulations, quality systems covering the maintenance organisation's organisational structure and obligations with regard to the qualifications of its personnel.

In the absence of common standards, transparency and/or confidence, the transnational recognition of qualifications – and hence

⁽⁸⁾ Frost & Sullivan study (<http://www.aerospace.frost.com> [04-04-2008]).

maintenance work – was sometimes subject to high transaction costs. This greatly inhibited the maintenance business and exchanges of this type were difficult to establish ⁽⁹⁾. A consensus therefore emerged: standards in Europe had to be harmonised. The process began with the standardisation of the technical requirements for maintenance, and continued with the standardisation of the quality systems of maintenance organisations (Part-145). Harmonisation of the skills profile of engineers authorised to issue release into service certificates had not yet taken place: this was the Part-66 work analysed in this paper.

Licence versus company accreditation, ensuring that engineers have the required experience

Our research into the debates held during the drafting of the maintenance qualification regulations revealed a disagreement concerning the best institutional method for ensuring a high level of qualifications. Should a personnel licensing system or a training system managed by specially accredited companies be introduced? Should personnel authorised to issue release into service certificates therefore have a standardised European (individual) licence or merely a certificate issued by his company (company accreditation)?

The system in which training is managed by companies was backed by France, which had been developing such a system since the post-war period. This model offers certain advantages compared with the licence system. It enables the supervisory authority to transfer some of the regulatory burden and monitoring costs to companies. It gives companies greater scope: the training creates skill profiles particular to the company which, unlike the licensing system, does not need external approval for its appointed 'release into service' engineers. Engineers merely have to attend an approved in-house training centre to certify that they have the basic skills.

At the same time, a large number of national aviation authorities, airlines and trade unions in the rest of Europe did not accept that training in companies in an accreditation system would be able to resist economic pressures. They stressed the guarantees that the economic independence of a licence system would provide. The

⁽⁹⁾ This tension can be seen in the expansion of the volume of aircraft maintenance services bought by airlines in Europe. In 1994, prior to the complete harmonisation of the technical, organisational and qualification regulations, these purchases stood at USD 3 billion (*Flight International*, February 1995). Twelve years later, after harmonisation, this figure stood at USD 10 billion (Frost & Sullivan, 2007).

position of the International Federation of Transport Workers ITF (1997) was representative of this position: 'Aircraft maintenance engineers should be subject to a national licensing system, with the privileges of the licence being conferred on the individual and not on the maintenance organisation. The absence of a licence managed by the State removes one of the most effective controls against downward economic pressure.'

As the air transport market is very cyclical in nature, there is a risk that during periods of strong recovery, maintenance companies might be tempted to quickly increase their numbers of authorised personnel and shorten preparation periods (in-house training, classroom time, experience) for engineers entitled to issue release into service certificates. When activity drops off, they may be tempted to cut spending on training and qualifying classroom time. This expenditure item is one of the few that can withstand such variability; many other areas of spending are outside the control of management, since they are set by regulations or the market.

In brief, in a company accreditation system, the quality of in-house training would be too vulnerable to economic pressures. The resulting risks mean that one of the basic reasons why it is agreed that skills profiles should be harmonised – that it promotes and extends the maintenance service business at European level – is not met. The risk of poor service quality due to inadequate skills is deemed to be so high that foreign companies and their respective National Authorities would not recognise maintenance work carried out by companies under the accreditation system.

In the end, following a political compromise between the Civil Aviation Authorities and the European Union, it was the licence system that was adopted. The EU proposed the creation of a specialist agency (the EASA) which would make it easier to achieve two major goals: more effective standardisation of aeronautical regulations and allowing the European aviation industry to compete with its North American counterpart. In return, the Civil Aviation Authorities (including in France) accepted the licence system, as demanded by the European Commission in its ongoing fight to create a common area of simplified transnational recognition of qualifications.

The way in which the Authorities were organised at European level, as a sort of 'club' (its decisions had to be unanimous) without any significant organisational infrastructure (there was no real monitoring of the implementation of its decisions), hindered initiatives

to develop and standardise technical regulations in particular, which still varied considerably.

Consequently, European aircraft manufacturers (of which a large number were based in France) were at a disadvantage because they had to produce several variations on a single aircraft for various countries and adopt multiple and expensive procedures in order to obtain certifications.

Another consequence of this organisational weakness in Europe was the risk of domination by the United States in the area of international air regulation. Its government preferred to enter directly into bilateral agreements with European countries instead of contracting with the European club of air authorities.

The implementation of the European regulation in the three countries studied

Three aspects of the transposition of the European regulation in the three countries considered deserve particular attention: the mechanism by which credits are grafted onto national training, and restrictions associated with the cultural dimension.

The issuing of credits for national training

The European regulation allows the complete or partial approval of existing national vocational training provided that the Civil Aviation Authority makes the recognition system public and can successfully justify it to the EASA. The option to grant credits, as set out in the Part system, should allow flexible integration of the regulation in the very varied national training systems in operation in Europe. It also has definite advantages in terms of costs, for example, because licences may now be obtained more quickly now that Part-66 modules are incorporated in structured training cycles in Part-147 accredited organisations, which considerably reduces the amount of experience required for the awarding of the basic licence ⁽¹⁰⁾. The fact that training is often organised as part of an apprenticeship scheme also offers savings for companies, which pay apprentices less than their ordinary employees. Finally, by facilitating faster

⁽¹⁰⁾ Training in an accredited Part-147 centre reduces the amount of experience required to obtain a B licence (technician) by three years (two years' experience instead of the five years required for an independent learner).

growth in the supply of licensed engineers, the credit system helps to reduce stresses in the labour market (some countries were at risk of labour shortages) ⁽¹¹⁾ and keep a lid on rising costs.

The national solutions adopted for the implementation of this regulation in the three countries studied (Haas et al., 2006) differed between Germany and France, on the one hand, which largely relied on their initial training systems, and the United Kingdom, which based the credit system on a small number of specialist aeronautical training centres already recognised (accredited) by the British Authority.

In France, the State retained control of the training provision in this specialist market, adapting its own training/certification while retaining their dual foundational and vocational purpose. One of the features of initial vocational training in France is that it is included in the general education and training system at various levels. All vocational training at a given level therefore includes several general training modules, preparing for continuation at the level immediately above, where appropriate. The elements of the European standard were grafted onto existing national training provision in this specialist area (*certificat d'aptitude professionnelle* for a mechanic's A licence, vocational Baccalaureate for an aircraft maintenance technician's B licence) when the diploma was reviewed and the core training content adjusted in the joint advisory bodies. In the case of the B licence, the content of the aeronautical vocational Baccalaureate covers approximately half of the corresponding European core content. The strong tradition in France of delegating training tasks to the school system is borne out by the fact that the National Civil Aviation Authority made the Ministry of Education responsible for implementing the basic training for the new licences ⁽¹²⁾.

In Germany, the solution adopted was the result of a compromise based on the convergence of the interests of the two stakeholders, the national education administrators and the Civil Aviation Authority, in safeguarding the dual system in the aircraft maintenance sector (Haas et al., 2007). This convergence of interests explains the main features of Part-66 in this country:

⁽¹¹⁾ Cf. debates in the British Parliament: Department for Transport, *Report of the inter-departmental working group on the training of aircraft maintenance engineers*, March 2003.

⁽¹²⁾ This Ministry had already delegated specialists in the aeronautical field to assist representatives from the DGAC (the Civil Aviation Directorate) when the regulations were being negotiated and developed.

- 87 % of the content (measured in hours of lessons) of the B licence training is validated by dual training focused on aircraft maintenance ⁽¹³⁾; this validation limits the duration of the additional training required to sit for the B licence examinations to 10 weeks (300 hours);
- two dozen associated dual training courses are partially validated: car, motorbike and naval mechanic; agricultural engineer; bodywork; production engineering-machining; boiler work; tooling; micro-technology; mechatronics; industrial maintenance; electro-mechanical engineering; electronics engineers (industrial, telecoms, energy, etc.).

This solution preserves both the identity and benefits of the national dual training system for aircraft engineers. With its 4 500 hours of theory and practice (including only 2 100 hours of preparation for the basic B1 licence examination), dual training prepares individuals for a wider range of jobs in the aeronautical industry, either in construction or maintenance. Furthermore, the dual licence also entitles access to higher level training in the industry, that of a 'Techniker.'

In the United Kingdom, politicians had decided that the development and introduction of solutions was the responsibility of those working in the training market. Since the 1980s, successive governments have left it to stakeholders in the market in question to find solutions for themselves. Three types of stakeholder have come to the fore in transposing the European regulation;

- accredited Part-147 specialist schools, generally private, that have the expertise in this area and deliver training courses for any component covered by the European regulation;
- since 2001, Foundation degrees have offered two-year basic training leading to a B licence, and to a possible Bachelor's degree at the end of three years;
- Further Education Colleges offer vocational aeronautical training, though this is not credit-based; it merely prepares students for the qualification tests organised by the Authority.

The public authorities confine themselves to providing financial support for the adaptations. The reason why it has only been possible in the UK to make the necessary adaptations to national structures, approved by the Civil Aviation Authority, at the Higher Education Level (the Foundation degree at Kingston University) is

⁽¹³⁾ What is covered in France and Germany by basic Part-66 training credits cannot be compared because of the dual purpose of the French diplomas (see above), which ensures that part of the core training content is devoted to general training subjects.

because vocational training providers at secondary level were not able to satisfy the accreditation requirements due to the high level of investment required for establishing highly-specialised training aimed at very few candidates.

The influence of national cultures on the ways in which the regulations are implemented

With regard to the actual transposition of European regulations, our research shows that France was slower than the other two countries. Its two neighbours commenced converting existing national licences from the end of the 1990s at the instigation of their holders, who were concerned that their qualifications should not be devalued. Whereas the Aviation Authorities in the other two countries were already running a licence system, the French Civil Aviation Authority had to introduce an entirely new organisation dedicated to the issuing and managing of licences, which had not existed under the previous accreditation system. As a reason for France's delay in transposing European directives, this is definitely closer to the truth than those which blame it on marked national 'arrogance,' (Falkner et al., 2005). Rather than a feeling that the previous national situation was better, it is the distance between the concepts of the two reference models which explains the delay in implementing the new Part regulations. The rate at which they have been catching up since 2002 is confirmation of France's capacity to react, once the process was initiated.

Confidence, a key element for effective recognition of qualifications and certifications

Our research amongst those involved in implementing the European regulations confirmed the importance of a key element in the EU approach to the recognition of diplomas and certificates: confidence in the quality of the educational organisations and the training delivered (Cedefop; Coles et al., 2005). What people said during our interviews suggests that this is far from being the case, despite the introduction of European certification.

The question whether the European regulation results in a reduction in the level of knowledge compared with the old national systems, was raised on a number of occasions by the parties concerned in the three countries. This shows that there is some degree of suspicion, with several countries (particularly those with a strong aeronautical tradition) even doubting whether there is full

compliance with this regulation. One interviewee referred to the emergence of a 'grey area' in the implementation of the regulation in certain countries, particularly as a result of training centres not satisfying the quality criteria (absence of up-to-date teaching materials, for example), a lack of rigour in audits, or even illegal practices by certain training establishments simply to ensure rapid success in obtaining a licence.

Everyone thinks they are losing out, for several reasons. One reason is due to the fact that a country may believe its national certification system prior to the European regulation offered greater guarantees than the new arrangements, and that the concessions which it has been required to make allow scope for quality requirements to not be met.

A second reason relates to the ways in which national solutions for recognising the qualifications of personnel already in post were negotiated. As the issuing of release for service certificates is a regulated activity, the national certification of personnel already in post (known as the 'grandfathers') had to be converted according to the terms of the new European licence. This conversion meant that restricted European licences had to be issued in each country; the right to undertake the work did not change, but was not as comprehensive as the rights accorded by the new European licence. For example, unlike a large number of national licences, the new European licence gives engineers the right to work on electrical systems. The 'grandfathers' had to undergo additional training and a familiarisation period to remove the restrictions imposed as part of the conversion. To remove these restrictions, each country negotiated special provisions with the European Authority, with reference to the pre-existing national training and certification systems. Unfortunately, according to our interviewees, the bilaterally-negotiated solutions were not sufficiently publicised, nor were the methods for monitoring their implementation specified, which would have made everyone feel as though they were in the same boat. The result is that everyone tends to criticise the perceived differences as being concessions granted to one or other Member State for a the transition period and/or because of its starting point.

This problem of the lack of trust stems more fundamentally from the fact that each country finds it difficult to assess/evaluate/compare the varying training and experience (including basic training) required of individuals under the previous national systems of other Member States.

The respective positioning of training courses is still a more general problem that is encountered when national certifications are compared. One of the goals of the introduction of a European framework for vocational certifications ⁽¹⁴⁾ is precisely to 'create a relationship of trust in the relating of certifications across countries and professional sectors.' Although this framework is currently being implemented under provisions relating to higher education, it is obvious that it has a much more general scope, particularly with regard to European regulations concerning regulated trades/activities, such as aircraft maintenance.

Conclusion

The movement to standardise qualifications at European level has so far only been seen in higher education, based on the BMD system, and in the harmonisation of academic qualifications for the liberal professions. Less well-known initiatives were taken first with the European vocational diplomas and, more recently, with the creation of European vocational certificates in regulated activities such as aircraft maintenance, which has been analysed in this paper.

As well as presenting and defining the characteristics of this particular form of standardisation, compared with what came before it, our attention focused on the real reasons for the decision to develop European standards in the sector studied. This is an activity that has long been regulated, in which the issues of safety and quality have always been the chief concern in each Member State of the European Union. Our interviewees acknowledged that pre-existing national regulations under a licence or accreditation system, as existed in France, had demonstrated their effectiveness.

Improving conditions to promote greater international mobility of staff, a reason often given for Community initiatives in training and certification, did not seem to be the real reason for creating a unified European licence. Following analysis, it became apparent that creating the licence was first and foremost a response to economic and commercial concerns. The introduction of a Europe-wide market for aircraft maintenance services required the harmonisation of regulations, including those applicable to employee qualifications, leading to a reduction in transaction costs.

⁽¹⁴⁾ Working document of the European Commission: *Towards a European framework of vocational certifications for lifelong learning*. Brussels, 8 July 2005.

Analysis of the ways in which Community regulations are being applied in aircraft maintenance in each of the three countries indicates that the fundamental characteristics of the national systems have been preserved. The influence of the national structures on the solutions chosen and the traditional distribution of roles between those involved in their development can clearly be seen: the heavy influence of the State in France, the key role of sectoral professionals and organisations in Germany ('private governments'), the position accorded to the market in the United Kingdom, these are the main features of the typical regulation systems in each of the three countries. The predictions made concerning the existence of national structural consistencies between the vocational, organisational and educational sectors are therefore confirmed as far as this particular transposition is concerned.

Although the measures required to transpose European decisions encourage Member States to share information, there is still a long way to go before the goal of mutual trust can be reached, nor is it a foregone conclusion, contrary to what is sometimes said, beyond the fact that European regulations and directives are binding as legal tools (Bouder, 2005).

One of our interviewees summed up the situation well: 'one of the main obstacles to a broad European system is getting countries that are defending sometimes hard-won territory (i.e. their autonomy) to accept regulations issued by a body which does not have any territory or country, and a system which is not attached to any other.' This exactly reflects Annie Vinokur's analysis (2005) of why countries are reluctant to accept constraints imposed by 'denationalised experts' in the absence of any real incentives in return.

The European Commission is very well aware of this situation and has taken steps to counter this feeling of submission and facilitate transparency. The development, at the request of the Heads of State, with voluntary participation based on a 'bottom up' approach this time, of a European framework for vocational certifications should contribute to this goal.

Bibliography

- Asseraf, Georges. Propositions pour l'organisation d'un cadre commun de l'enseignement supérieur en Europe. Projet européen de professionnalisation durable, vers un système de certification homogène pour les métiers. *Actualité de la formation permanente*, N° 190, May-June 2004.
- Bouder, Annie. La transparence des qualifications et son articulation avec la construction des diplômes en France et en Europe. *CPC info*, Ministry of National Education, first quarter 2005, No 40, p. 33-36.
- Cedefop; Coles, Mike; Oates, Tim. *European reference levels for education and training. Promoting credit transfer and mutual trust*. Luxembourg: Publications Office, 2005. (Cedefop Panorama series, 109).
- Commission Regulation No 2042/2003, Annex II (Part-145), Annex III (Part-66), Annex IV (Part-147). *Official Journal of the Communities*, 28 November 2003, No L 315, p. 1-165.
- Construction des qualifications européennes*. Strasbourg: Haut Comité Éducation-Économie-Emploi, Proceedings of the symposium, 30 September – 1 October 2004.
- Council Regulation (EEC) No 3922/91 of 16 December 1991 on the harmonisation of technical requirements and administrative procedures in the field of civil aviation*. Brussels: Council of the European Communities, 1991.
- Falkner, Gerda; Treib, Oliver; Hartlapp, Miriam; Leiber Simone. *Complying with Europe. EU Harmonisation and Soft Law in the Member States*. Cambridge: University Press, 2005.
- Frost & Sullivan. Decision Support Database – Maintenance Repair and Overhauling. (<http://www.aerospace.frost.com>), 2007.
- Haas, Joachim. Occupational licensing versus company-led training. *International Sociological Association, 16th World Congress of Sociology*. Durban, 23-29 July 2006.
- Haas, Joachim; Ourtau, Maurice. *De la réglementation nationale au certificat européen: tensions et solutions pour trois pays (Allemagne, France, Royaume Uni): Le cas de la maintenance aéronautique*. Paris: Ministry of National Education, 2006. (CPC documents, No 2006/4, December).

- Haas, Joachim; Ourtau, Maurice. Certification européenne: rapprochement des structures nationales de formation? *Revue française des sciences sociales. Formation Emploi*, No 99, July-September 2007, p. 123-137.
- ITF Resolution passed at the Civil Aviation Section Ground Staff Committee*. London: International Transport Workers Federation, 9-10 December 1997.
- JAR-66 Certifying Staff Maintenance*. Joint Aviation Authorities. Cheltenham: Westward Digital Ltd. 1998.
- JAR-145 Approved Maintenance Organisations*. Joint Aviation Authorities. Cheltenham: Westward Digital Ltd., 1998.
- JAR-147 Approved Maintenance Training / Examinations*. Joint Aviation Authorities. Englewood, Colorado, U.S.A, *Global Engineering Documents*, 1998.
- Maurice, Marc; Sellier, François; Silvestre, Jean-Jacques. *Politique d'éducation et organisation industrielle en France et en Allemagne*. Paris: PUF, 1982.
- Möbus, Martine; Verdier, Éric (eds.). *Les diplômes professionnels en Allemagne et en France. Conception et jeux d'acteurs*. Paris: L'Harmattan, November 1997.
- Notice of Proposed Amendment (NPA), No 2007-04*. Cologne: European Aviation Safety Agency, 2007.
- Report of the inter-departmental working group on the training of aircraft maintenance engineers*. Department for Transport (DfT). London: DfT press office, 2003.
- Soskice, D.; Hanke, B. De la construction des normes industrielles à l'organisation de la formation professionnelle. Une approche comparative. In Möbus, M.; Verdier, E. (eds.). *Les diplômes professionnels en Allemagne et en France. Conception et jeux d'acteurs*. Paris: L'Harmattan, November 1997.
- Vinokur, Annie. Mesure de la qualité des services d'enseignement et restructuration des secteurs éducatifs. *Cahiers de la recherche sur l'éducation et les savoirs*, 2005, special edition No 1, p. 88-108.